

Mr. Rümker has presented to the Society the manuscripts containing his Observations of Southern Stars made at Paramatta in the years 1826 and 1827. The thanks of the Council were voted to him for this valuable gift.

On Heliotypography. By Warren De La Rue, Esq.

The accompanying print of Sun-spots was produced from a collodion negative, taken by means of my Newtonian reflector of 18 inches aperture and 10 feet focal length, on the scale of 3 feet for the Sun's diameter.

The original focal image was enlarged before reaching the sensitive plate from about 1 inch in diameter to the scale of the picture, by means of a new combination of lenses which projects the image without sensible distortion on a flat field, and whose visual and chemical foci coincide perfectly.

The camera which is attached to the eye-end of the telescope will hold a plate 18×18 inches, so that about one-fourth of the Sun can be depicted at one time. Even for a picture of such a size, the apparatus is very heavy, and could not be carried safely at one end of the tube, unless a provision had been made to support it. This is effected by means of a radius bar, which moves on a short independent axis, fixed on the framing of the telescope, in the prolongation of the polar axis.

When Sun-pictures are taken, the telescope tube is for convenience rotated in its cradle through an arc of 90° from its ordinary position, so as to place the eye-piece underneath. To the sliding tube which carries usually the eye-piece, is fixed the instantaneous apparatus, which moves in a direction at right angles across the tube. The moveable plate of the instantaneous apparatus slides as nearly as possible in the plane of the primary focal image.

The enlarged image is received at a distance of about 4 feet from the secondary magnifier.

The printing block was produced by M. Paul Pretsch, according to a method he has invented. The process may be rendered sufficiently clear without revealing the exact process, which he does not wish to disclose at present.

Gelatine is mixed with a salt of chromic acid, such as bi-chromate of potash, and poured on to a glass plate, and allowed to dry in the dark. If a plate so prepared is exposed to light, and a similar plate is retained in the dark, and the two plates are subsequently moistened with water, it will be found that the gelatine which has not been exposed to the

action of the light will swell up like ordinary gelatine, while that which has been exposed to light will have become changed, and will remain unacted on by the water.

If, therefore, an ordinary negative be placed over the dry prepared film of gelatine, and both are submitted to the action of light, the gelatine will become more or less changed in proportion to the intensity of the light transmitted through the several parts of the negative. For example, in the case of a negative of a Sun-spot, much light will pass through the image of the spot, less through that of the penumbra, and still less through that of the bright parts of the Sun's surface, and the light so transmitted will produce a corresponding hardening of the prepared surface.

When therefore the plate is subsequently moistened, the part corresponding to the spot will remain flat, more or less in proportion to the intensity of light which has acted on it, the bright parts will swell, and the gelatine film will represent the matrix of a surface-printing block.

It is now only necessary to obtain, by means of known processes in electro-metallurgy, a counterpart of the gelatine. The plate so prepared is the printing block, which will furnish many thousand impressions at an ordinary printing-press, it being however necessary from time to time to clear the block, which is liable to become clogged on account of the want of depth in the light parts. On observing the impression at a little distance from the eye, a sort of mottling will be perceived on the bright parts of the picture; this is a true representation of the Sun's surface; on the other hand, an examination of the picture by means of a magnifier will show a vermicelli sort of granulation, which does not belong to the Sun, but results from the process and arises from the change which takes place in the gelatine film passing as it were from the gelatinous or dynamic condition to the crystalline or static condition of matter.

The grain may be made coarser or finer, and need in no way interfere with a picture more than the lines of a steel plate or the grain of a lithographic stone interferes with pictures engraved on the first or drawn on the second.